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ABSTRACT

A portable minicomputer collected data about elementary and secondary social studies teachers' oral questions and the subsequent verbal behaviors of the teachers and the students. Data indicated that literal types of questions were posed most often by teachers at the rate of 1.5 per minute, and the duration of the students' answers was associated with the cognitive levels of the questions asked by the teachers. After students answered the questions, teachers repeated students' answers and asked for additional responses. Teachers spent an average of 40 percent of the lesson time giving direct instruction to students and 20 percent on noninstructional activities. The teaching style used by teachers influenced the amount of time they spent on instruction and noninstructional activities. Teachers asked low level questions, despite the fact that this practice influenced the verbal behaviors of both teachers and students. The skills of asking higher thinking questions should be practiced by student teachers, or teachers in a classroom setting, and feedback and coaching by other teachers and associates should be made available to them to help increase these skills. (Author/JD)

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TEACHERS' ORAL QUESTIONS AND SUBSEQUENT VERBAL BEHAVIORS OF TEACHERS AND STUDENTS*

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Abstract

A portable minicomputer was used to collect data about elementary and secondary social studies teachers' oral questions and the subsequent verbal behaviors of the teachers and students. Literal types of questions were posed most often by teachers at the rate of 1.5 per minute. The duration of the students' answers is associated with the cognitive levels of the questions asked by the teachers. Teachers repeated and answered their own questions before students answered them. After students answered the questions, teachers repeated students' answers and asked for additional responses. Teachers spent an average of forty percent of the lesson time giving direct instruction to students and twenty percent on noninstructional activities. The teaching style used by teachers influenced the amount of time they spent on instruction and noninstructional activities.

Teachers' Oral Questions and Subsequent Verbal Behaviors of Teachers and Students

Questioning strategies are considered an effective way to help students process textual information. Teachers can use questions to direct the thinking of students in examining specific facts, applying, analyzing, and evaluating ideas. The types of questions, and the way teachers ask them, are believed to affect students' responses. It is assumed that this accentuation on questioning techniques, included in the pedagogical literature and in preservice and inservice teacher education programs, influences the verbal behaviors of teachers. To examine this problem, a survey study was conducted to investigate the types of oral questions teachers of social studies ask, and the subsequent verbal behaviors of the teachers and the students. A microcomputer, the Timed Interval Categorical Observation Recorder (TICOR), was used to collect the data. With this machine an observer can record classroom behaviors at the time they occur with time orientation. Thus, the observed behaviors are reported in small time frames, with the round-off point being one-tenth of a second.

Previous Questioning Strategies Research

Questioning strategies have been examined by researchers and authors for many decades. In an 1879 publication by Fitch it was reported that the first series of lectures on teaching methods at Cambridge University included information about questioning techniques. Stevens (1912) found that a sample of high school teachers asked nearly 400 questions a day, and two-thirds of the teacher's questions required

direct recall of textbook information. Since this early period, many books about teaching methods have contained discussion about questioning strategies (Daines, 1982; Hunkins, 1972 and 1976; Miller, 1922; Ruediger, 1932; and Sanders, 1966).

Beittel and Clements (1964) studied the questioning strategies of art teachers. They asked a range of ten to 185 questions within a fifty minute period, and the mean number of questions asked was fifty-nine. Over half of the students' answers were of one second or less in duration. Fourteen fifth grade teachers asked an average of sixty-four questions in a thirty minute social studies lesson, according to Schneiber (1967). Hoetker (1968) reported that junior high English teachers asked a question every 11.8 seconds.

The types of questions teachers ask influence the kinds and length of students' responses. Gallagher and Aschner (1963) examined the thinking expressed in the oral behaviors of teachers and students. They reported a correspondence between the cognitive level of teachers' questions and students' responses. Even a slight increase of higher level type questions yielded a definite increase in higher thinking responses. Taba and Elzey (1966) cited an almost perfect relationship between the level of comprehension students presented in their answers, and the types of questions teachers asked. Guszak (1967) stated that students adapt their way of reading to the types of questions asked by teachers. He found that 70.4 percent of the questions asked in reading lessons were at the literal level. Many of these questions asked for the recall of minute facts. In a later study, Schafer (1975) determined the most frequent type of question asked by teachers required the recall

of factual information. The types of questions asked affect students' cognitive processes as evidenced by the number of words used in their answers. Smith (1978) found that second and fourth grade children employed longer communication units when responding to interpretive questions than they did with factual questions.

Teachers' questioning behavior is believed to influence students' achievement. According to Hunkins (1968 and 1974), a group of sixth grade students who were consistently asked higher level questions produced significantly greater scores in social studies achievement than students who were asked only low level questions. Pfeiffer and David (1965) found that teachers used more fact questions than other kinds of questions in ninth grade social studies examinations. When teachers asked a higher proportion of higher thinking questions in the classrooms, their students performed better on tests which contained either low thinking questions, high thinking questions, or a combination of both (Ladd and Anderson, 1970). Allen (1970) compared groups of students given either memory level or higher-level questions during the reading of social studies. The subjects' achievement on the posttest, consisting of factual questions, was higher on questions related to the information they were asked about in the adjunct questions posed during their reading. The questions focused students' attention on particular information contained in the materials. Derhammer and Cormier (1972) analyzed the classroom test questions of twelve elementary school teachers. They found that teachers used fewer test questions that required higher levels of thinking than they used during their lesson presentations. With training, these teachers increased the incidence

and correlation between the higher thinking type questions asked in the classroom and tests.

The average latency or wait-time between the end of teachers' questions and students' responses was found to be approximately one second. After students made a response, teachers usually waited less than one second to either repeat the answer, to rephrase or ask another question, or to call on another student. With an extended wait-time of three to five seconds, the length of students' responses was increased. The students organized more complete answers, they used longer sentences, and they provided evidence to support their ideas. It was also noted that classroom disciplinary actions by the teachers were lessened when they used longer wait-time (Arnold, Atwood, and Rogers, 1973 and 1974; Rowe, 1969 and 1974; and Atwood and Stevens, 1976). Tobin and Capie (1980) found that teachers' latency patterns in a middle school influenced students' responses in science activities. The teachers' use of higher thinking level questions and a wait-time of approximately three seconds did increase students' talk and the complexity of their answers.

Rowe and her associates (1969) noted that when teachers offer verbal rewards in classroom discussions the students seek teachers' approval by the use of speech and eye movements, and tend to ignore information supplied by other students. Rowe also reported that verbal rewards constitute up to one-fourth of the teachers' total speech output, students' involvement in a classroom discussion declines, and the positive influence of a longer wait-time is diminished. In comparison, students participate more and are more diverse in their

responses when teachers use rewards sparingly or even withdraw them during a discussion.

A critical factor in improving the effectiveness of an instructional model is a teacher's accurate perception of his own teaching. The research of Parsons and Shaftel (1967) found the types of questions teachers ask are established early in their teaching careers. Davidson (1969) reported significant changes from lower to higher levels of thinking occurred among elementary school students when teachers were provided with objective feedback from their own teaching. In a study conducted by Hogg (1973), 87 percent of the questions asked by student teachers were factual. Watson (1974) found in his study that teachers increased their use of open-ended questions after completing a graduate course on the modification of their instruction patterns. In another study, students showed an increase in frequency of higher cognitive and longer responses when their teachers participated in an inservice program to improve questioning skills (Galassi, 1974).

Durkin (1978-1979) conducted an observational study in grades three through six. She found almost no comprehension instruction in the teaching of reading, social studies, and science. When comprehension instruction was observed, the teachers used literal level questions to help students master facts and to assess students' understanding of the materials they had read. Durkin also reported that the teachers spend considerable time on giving, completing, and checking assignments, and large amounts of class time were spent on transitional and noninstructional activities.

Definitions

In a pilot study it was determined the teachers of social studies used teaching modes that could be classified as comprehension check, discussion, lecture, or open book. The techniques teachers used to conduct their lessons served as a basis for defining the four teaching models. In the final study, each observed lesson was categorized intc one of these four teaching styles.

Comprehension check refers to the teacher using the lesson time to check and ascertain students' memory of facts and/or understanding of a text selection which was previously read by the students or presented by the teacher. The teacher poses questions in rapid succession, and provides instruction concerning the topic being studied, intermittently taking time to clarify or extend information given in a student answer.

Discussion consists of a free flowing interaction among the students and teacher, with the teacher assuming the lead in asking questions after the students have read a specified text selection or supplementary materials.

Lecture relates to a teacher centered presentation. The teacher uses more of the lesson time to acquaint students with text information. Questions are interspersed throughout the verbal discourse.

Open book pertains to most of the lesson time being spent in oral reading of the text by the teacher and/or students. In this model, students are expected to follow along in the text as a reader reads a passage. The teacher asks questions about the content of the text before, during, or after the oral reading.

The questions posed by the teachers and the students' responses were classified as being in the cognitive or affective domain. The cognitive questions and answers were placed into one of three hierarchial levels.

Literal questions are lower thinking level questions. Responses to this type of question require students to recognize or recall facts, details, dates, events, principles, trents, etc. This also includes "yes" or "no" type questions.

Interpretive questions include various types of higher level questions. Responses to questions placed in this category necessitate that students make inferences, interpret ideas such as stating a main idea in one's own words, make a prediction based on trends, compare or contrast ideas, determine cause and effect, analyze ideas, and show relationships between concepts.

Application questions are the highest level of questions in the classification scheme used in this study. Responses to this level of questions require students to make an application of knowledge to solve problems, to create something new, or to make a judgement based on some criteria.

For this study, all affective questions were combined into one category, and the following definition was used.

Affective questions are posed to allow students to examine their interests, appreciations, attitudes, opinions, and values in reference to a concept or idea.

The definitions of other teacher behaviors observed during the social studies lessons are listed below.

Noninstructional activities pertains to management transactions. These include the teacher directing the students in the use of equipment and materials, making and checking students' assignments, arranging for the seating of students, organizing students for activities, and the disciplining of students.

Teacher instruction refers to a teacher communicating and explaining content to students through a monologue process, and the process of clarifying and extending the students' responses to questions posed by a teacher.

Methods

The purposes of the research were to investigate the types of oral questions teachers of social studies ask students concerning their textual materials, the lapse time between the questions and the students' responses, and the verbal behaviors of the teachers and students after the questions were posed.

The types of questions used in different teaching models and at different grade levels were examined. Also investigated were the cognitive thinking levels and the duration of students' answers to teachers' questions, and the quantity of time teachers spend in instructional and noninstructional activities.

Thirty-eight teachers, teaching social studies in the second, fourth, sixth, eighth, tenth, and twelfth grades were observed. These teachers were selected at random by the school principals to participate in the study. The schools are located in suburban and rural areas, and most students were white and middle class. The remaining students were from both the upper and lower socioeconomic levels.

In this study, each teacher was observed for three or four lessons, or approximately two hours. If a teacher was administering a written test or showing films, the observation was postponed until the subsequent lesson. To provide greater reliability in the recording of behavioral observations, a pilot study was conducted, and a second observer used a separate TICOR to record the oral questions of the teachers and the ensuing sequential verbal behaviors of the teachers and students. An average inter-reliability of 0.72 was reached.

Instrument

The Timed Interval Categorical Observation Recorder (TICOR), designed around the INTEL 8080 microprocessor, was used to collect the data. TICOR is a portable microcomputer designed to automate the collection of large amounts of sequential and simultaneous behavioral observations and associated durations. When the appropriate key is depressed, the coded data is recorded by event category and also by its relative time of occurrence and duration. This time orientation of the data makes it possible to study events by patterns or sequences, as well as by frequencies and durations. The system is designed to record observed events, and to provide both ratio and nominal data on a large number of related variables during each of the observation periods (Wadham, 1979). The use of TICOR enables an observer to collect more detailed and different kinds of data during an observation than if a paper and pencil measure or a timer in seconds were used. The numbers reported in this study may be smaller than in other studies because the data is collected in quarter seconds of the time utilized, null time, and total time.

Results

Seventy-five hours were spent in observing 143 social studies lessons. During these lessons, the sequential verbal behaviors of thirty-eight second, fourth, sixth, eighth, tenth, and twelfth grade teachers and their students were recorded on the TICOR, a minicomputer. The types of questions asked by the teachers, the pause or elapsed time between the end of teachers' questions and the students' answers, and the duration of the students' responses to the questions are listed below.

1. A total of 5289 questions were posed by the teachers, and 93 percent of these questions were at the literal level of comprehension. In contrast, only seven percent of the questions were interpretive, less than one percent were affective, and the application types of questions were not asked.
2. The average rate of questions asked per hour by the teachers was seventy-eight, or 1.3 per minute. Second grade teachers asked the most questions; they averaged 105 per hour, or 1.8 per minute. The tenth grade teachers asked the least number of questions with an average of forty-nine per hour, or 0.8 per minute.
3. The teachers asked an average of eighty-eight questions per hour or 1.5 per minute when they were checking students' memory and comprehension of textual information, and during the discussions of content. An average of seventy questions per hour or one (1.2) questions per minute was asked when teachers used the open book style of teaching. When the teachers used

the lecture mode of teaching they asked an average of 54 questions an hour or one (0.9) questions per minute.

4. The discussions style of teaching was used by the teachers in almost one-half (46 percent) of their lessons. Open-book was the least used mode of teaching (8 percent). In the remaining lessons, checking comprehension and lecturing were used 17 percent and 16 percent of the time respectively. Twelve percent of the lessons were classified into mixed categories and were not used in the analysis of data.
5. The average latency or wait-time was two seconds between the end of both the literal and interpretive questions asked by teachers and the students' responses.
6. Regardless of the teaching style that the teachers were using, the elapsed time between the end of their questions, and the students' responses, did not increase when higher level questions were asked.

Insert Table 1

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7. Three seconds was the average duration of students' answers to literal level questions at all six grades. Students' responses increased two seconds (from three to five seconds) in duration when they answered interpretive questions. The twelfth grade students had the shortest duration for their answers to both literal and interpretive questions (two and three seconds). The fourth and tenth grade students' answers to literal and interpretive questions were the longest in duration. The

duration of responses was four and seven seconds for the fourth grade students, and four and five seconds for the answers of the tenth grade students.

8. The duration of students' responses to interpretive questions was longer (four to six seconds) when teachers used the lecture mode of teaching than the three to five seconds during discussions. The shortest answers (three seconds) occurred when teachers asked literal and interpretive questions to check students' memory and comprehension of textual information. The students' responses increased only one second (from three to four seconds) when teachers asked interpretive questions in an open book mode of teaching.

Insert Table 2

Students' answers to questions asked by their teachers were classified into different levels of thinking. It was also recorded if two or more students responded at the same time to questions or if they indicated they did not know the answer to the questions. Students made unsolicited comments related to teachers' questions and the comments of other students. The number and duration of these comments and the other findings are listed.

1. There were 5658 responses by students to the 5289 questions posed by the teachers. There were more student answers than questions because more than one student responded to some of the questions. Almost all of the students' answers (88 percent) to those questions were at the literal level, regardless

of the grade levels and the teaching styles. Six percent of the students' answers were at the interpretive level. A small number of students, six percent, either indicated they did not know the answers or two or more of the students answered the teachers' questions at the same time.

2. When teachers checked students' memory and comprehension of textual information, only two percent of the students' answers were at the interpretive level as opposed to the six and seven percent of the students' responsnes when the teachers used the other three teaching styles.
3. An average duration of four seconds was found for the 1578 comments by the students that were not direct responses to their teachers' questions. The longer comments, five seconds in duration, were made by students in grades two and four. Students in the sixth and eighth grades made the shortest unsolicited comments, only two seconds in duration.
4. The longest duration for students' unsolicited comments (four seconds) was made when teachers used the discussion and lecture styles of teaching. The shortest unsolicited comments (two seconds) were used when teachers used the open book mode of teaching.

The sequential verbal behavior patterns of teachers, both before and after students answered their questions, were observed. Eight verbal behaviors based on the findings of the pilot study were identified for this purpose.

1. The teachers restate the question before the students respond.
2. The teachers rephrase the question before the students respond.
3. The teachers answer their own questions before the students respond.
4. The teachers restate the students' answers.
5. The teachers reject or correct students' answers.
6. The teachers ask for students to give additional answers.
7. The teachers give students verbal praise for their answers.
8. The teachers ask students to repeat their answers.

The teachers' verbal behaviors after they had asked questions were coded. These behaviors were rank-ordered according to the frequency of behavior occurrence. The findings are listed below.

1. The rank order of frequency for the thirty-eight teachers' verbal behavior, before students answered the teachers' questions is:
   a. The teachers restated their questions.
   b. The teachers answered their own questions.
   c. The teachers rephrased their questions.
2. The greatest frequency of verbal behavior for teachers of the second, fourth, and sixth grades was rephrasing their own questions before students answered them. These teachers answered their own questions least often.
3. In contrast, the greatest frequency of verbal behavior among the teachers of the eighth, tenth, and twelfth grades was answering their own questions before the students answered them.

4. The verbal behaviors were very much alike for all thirty-eight teachers after the students answered their questions. In rank order of their frequency of response, the teachers' actions are reported below.
   a. The teachers repeat students' answers.
   b. The teachers ask for additional responses.
   c. The teachers give students verbal praise for their answers.
   d. The teachers reject or correct students' answers.
   e. The teachers ask students to repeat their answers.

The amount of time the teachers devoted to giving instruction to their students, and the total time they spent in noninstructional activities, were recorded. The findings are listed below.

1. The thirty-eight teachers gave direct instruction to their students an average of 40 percent of the time during the observed lessons. The amount of instruction varied from 53 percent at the tenth grade level to 29 percent at the eighth grade level.
2. The greatest amount of time devoted to instruction (58 and 43 percent) was given to students when teachers were using the lecture and open book styles of teaching. The least amount of time apportioned to instruction occurred when teachers were checking students' memory and comprehension of textual information (30 percent) and during the discussion style of teaching (37 percent).
3. The thirty-eight teachers spent an average of 20 percent of their time on noninstructional activities. The quantity of

time varied from 28 percent at the sixth grade level to 16 percent for the fourth grade.

4. Less of the lesson time was spent in noninstructional activities (13 and 17 percent) when teachers used the lecture and discussion teaching styles. In contrast, the amount of time spent in noninstructional activities increased to 26 and 29 percent when teachers checked students' comprehension and used the open book modes of teaching.

Discussion

TICOR was considered to be an efficient way to collect data in a classroom setting. More variables than used in this research, including simultaneous behaviors, can be collected by TICOR to accommodate the study of many classroom behavior patterns, sequences, frequencies, and durations. The machine automated large amounts of behavioral observations and durations for this study. This data about teachers' questions and the ensuing verbal behaviors of the teachers and students was analyzed and the results presented. The interpretation and inferences of the findings follow.

A cognitive correspondence existed between the level of teachers' questions and students' answers since most of the questions and answers were at the literal level. If the teachers had asked a greater number of higher thinking questions, this cognitive correspondence may have been different, although it has been postulated in the literature that teachers communicate their expectations to students through the kinds of questions they ask. The preponderance of literal questions posed by the thirty-eight teachers indicated that classroom questions continue to be

at the lower thinking level as reported in the findings of many previous studies.

The pacing of questions was rapid. The rate was approximately one and one-half questions per minute at all grade levels, whether the teachers were checking students' memory and comprehension of textual materials, or using the discussion approach to teaching. Furthermore, the length of time between the end of literal and interpretive questions, and the responses of the students, is short as evidenced by two seconds being the average elapse time at all grade levels. Regardless of the teaching style, the elapse time did not increase.

The duration of students' answers is associated with the cognitive levels of the questions asked by teachers. At all grade levels, the average duration of students' answers to interpretive questions was two seconds longer than their answers to literal level questions (three to five seconds). The duration of students' responses to interpretive questions also increased two seconds when the lecture and discussion modes of teaching were used. However, the students' answers were longer in duration (four and six seconds) when the literal and interpretive questions were asked in the lecture mode of teaching, whereas the duration time was shorter (three and five seconds) in the discussion teaching style. This pattern changed when teachers checked students' comprehension. The duration of the students' responses remained at three seconds, regardless of the type of questions asked. The length of the students' responses only increased one second (from three to four seconds) when the open book mode of teaching was used. Regardless of

the style of teaching, the level of questions asked by the teachers has the greatest influence on the duration of students' responses.

The teachers spent an average of 60 percent of their time, during the observed lessons, providing students with direct instruction and in noninstructional activities. The ratio of time was two to one. Thus, the teachers spent twice as much time in giving monologue instruction as they spent on noninstructional activities. The teaching styles used by the teachers seemed to have greater influence than the grades they taught in determining the quantity of time they spent on instructional and noninstructional activities. The teachers spent a greater amount of time on noninstructional activities when they used the teaching styles of an open book and comprehension check. As indicated in the professional literature, the teachers used more time for direct instruction when they used the lecture and open book modes of teaching. At each higher grade level there was a small but constant increase in the amount of instruction provided to students, with the exception of the eighth grade. Since the sixth grade teachers spent more than one-fourth of their time on noninstructional activities, it might be assumed there was a need to help the students to adjust to class schedules, academic and personal expectations. The remainder of the lesson time, 40 percent, was spent in teachers asking oral questions to direct students' attention to facts, issues, and concepts they considered important, and the students' answers to the questions. If the teachers considered the use of oral questions as a form of instruction, then most of the observed lessons were devoted to teacher instruction through the use of teacher questions and teacher monologue. A major concern is that the

struction was focused on the lower level of thinking, and the students were not being taught or encouraged to use higher thinking skills.

There were times when students made comments that were not in direct response to questions posed by the teachers. (The average duration of these responses was four seconds.) The students seemed eager to share ideas with their peers, but they asked very few questions. The teachers didn't seem to encourage the students to make inquiries. Instead, the teachers assumed the dominant role in asking questions and in other verbal behaviors during the observed lessons. Furthermore, the teachers did not teach students how to use questions and study skills to process textual information during any of the observed lessons.

The verbal behaviors of the teachers showed a definite pattern after they posed their questions and before the students answered them. The teachers either restated, answered, or rephrased their questions. Thus, it is possible they were dissatisfied with their own questions. Apparently they wanted to emphasize the questions to the students or they wanted the students to respond more quickly, or they were impatient and wanted to move forward to other questions. After the students answered the questions, the teachers repeated the students' answers more frequently than any other verbal behavior. Do teachers envision the repetition as an opportunity to teach and emphasize an idea? Is the behavior a habit that teachers have failed to examine and evaluate? The procedure of teachers repeating students' answers is often considered a process that lessens not only students' listening skills, but also their motivation to listen to the ideas expressed by others.

Asking for additional responses to their questions was the second most frequent verbal behavior of the teachers after students initially answered the questions. Why should teachers ask for additional responses when literal types of questions were used 93 percent of the time? Do teachers use this process as a technique to involve the students in the classroom activities? Do teachers desire the students to make inferences, discuss cause and effect, and other higher thinking types of answers? Do they realize that their model of asking literal questions, and their constant repetition of literal answers, connotes to students that teachers expect students to perform at the factual and recall level of thinking?

Giving verbal praise to students for their literal level answers was the third most frequent verbal behavior of teachers after students answered questions. This process can constitute a fairly large part of a teacher's speech output when the procedure is used on a regular basis. If teachers used other means to indicate a correct answer and their approval, teachers and students would have more time to spend on instruction and answers.

Helping students to increase their comprehension of textual information is an important factor in teaching. The approach to this task is broad and may vary in different situations. In this study it was noted that teachers took the instructional lead. The teachers did not teach students how to ask questions, participate in a discussion, or study a text to process content. Instead, in both the pilot and this study, teachers communicated ideas directly to students for them to learn. Apparently, in teacher education programs, teachers are not

taught the importance of conducting and involving students in a discussion, involving students in asking questions, and teaching students how to study.

Ways of asking questions and involving students in the asking of questions have been included in preservice and inservice programs over a period of numerous years, yet, according to this study, the thinking level of oral questions teachers ask seems unchanged. There is always a period of uneasiness when a person is learning a new skill, such as asking oral questions during a lesson. Many times, the discomfort is great enough that even experienced teachers report the ideas do not work, and they discontinue trying to use them. Learning to use new skills in isolation does not insure its transfer into teaching procedures. According to Joyce and Showers (1982), the feedback and coaching of teaching is a major factor in helping teachers learn to use teaching techniques. The feedback and coaching of teaching should occur after the teachers understand the theoretical basis of a teaching method. The conditions of a preservice and graduate course or the watching of a demonstration at a staff development meeting, are different from the training situations in which a skill is practiced in a classroom with regular feedback and coaching made available. Berliner agrees, and advocates, that feedback and coaching are basic to improving teacher effectiveness in the classroom (Brandt, 1982).

It was concluded that teachers continue to ask low level questions, despite the fact that this practice influences the verbal behaviors of both teachers and students. The instruction provided to the students seems to be influenced by lower thinking questions. Because of the

findings and implications of this classroom study, together with the knowledge that preservice and graduate programs include questioning strategies, it is recommended that the skills of asking higher thinking questions should be practiced by student teachers, or teachers in a classroom setting, and that feedback and coaching by other teachers and associates be made available to them to help increase these skills.

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Table 1

Latency Time in Seconds Between Teachers'

Questions and Students' Answers

	Literal Questions	Interpretive Questions
Grade level		
Second	1.2	1.9
Fourth	1.7	1.9
Sixth	1.0	2.0
Eighth	2.1	1.6
Tenth	1.8	2.1
Twelfth	1.4	2.1
Average	1.6	2.0
Teaching Style		
Comprehension check	2.4	1.6
Discussion	1.3	1.8
Lecture	2.1	2.2
Open book	1.0	1.2

Note. The time is recorded to the nearest one-tenth of a second.

Table 2

Duration Time in Seconds of Students'

Answers to Teachers' Questions

	Literal Questions	Interpretive Questions
Grade Level		
Second	2.5	4.3
Fourth	3.5	7.2
Sixth	2.7	4.9
Eighth	3.3	3.6
Tenth	3.7	5.4
Twelfth	2.2	3.0
Average	3.0	4.8
Teaching Style		
Comprehension Check	3.0	2.9
Discussion	2.8	4.8
Lecture	3.8	5.9
Open book	2.7	3.8

Note. The time is recorded to the nearest one-tenth of a second.